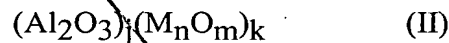


O is oxygen;

M is an element selected from either Group IIIB or Group IVB of the periodic table; and
j ranges from about 0.5 to about 4.5; k is equal to about 1; n ranges from about 0.5 to
about 2.5, and m ranges from about 1.5 to about 3.5.

Please replace Claim 34 with the following amended claim:

34. (Amended) A field effect transistor comprising:
an integrated circuit substrate having a first surface;
source and drain regions in said substrate at said first surface in a
spaced apart relationship; and
a gate insulating layer on said substrate at said first surface between said spaced apart
source and drain regions, said gate insulating layer comprising a non-crystalline oxide
represented by the formula (II):



wherein:

Al is aluminum, O is oxygen, M is an element selected from either Group IIIB or Group IVB of
the periodic table, j ranges from about 0.5 to about 4.5, k is equal to about 1, n ranges from
about 0.5 to about 2.5, and m ranges from about 1.5 to about 3.5.

REMARKS

Applicants appreciate the thorough examination of the present application as evidenced
by the Office Action (the Action) dated September 5, 2002. Claims 1-3, 11-26 and 34-46 are
pending in the present application. Applicants appreciate the indication that Claims 20, 21, 25,
26 and 35-46 contain allowable subject matter. Applicants have amended claims 1, 4, 11, 24,
and 35. Applicants have amended the specification at page 1, lines 3-6 and at page 2, lines 4-14
in order to correct a typographical error.

The Action states that the Information Disclosure Statement filed October 19, 2001 fails to comply with 37 C.F.R. § 1.98(a)(2). Claims 1, 3, 11, 15-17, 19 and 22 stand rejected under 35 U.S.C. § 102(b). Claims 12 and 13 stand rejected under 35 U.S.C. § 103(a). The concerns raised by the Examiner are addressed below as set forth in the Action.

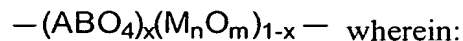
I. Information Disclosure Statement

The Action states that the Information Disclosure Statement (IDS) filed October 19, 2001 fails to comply with 37 C.F.R. § 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Action, page 2. Applicants submit that the references used to prepare the copies for the IDS are legible, and thus, does not understand how illegible copies would have been received by the United States Patent and Trademark Office. However, Applicants resubmit an IDS along with copies of references cited therein believed by Applicants to be legible, and apologize for any inconvenience arising as a result of the previous IDS submission.

II. Rejection Under 35 U.S.C. § 102(b)

Claims 1, 3, 11, 15-17, 19 and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,621,681 to Moon (Moon). More specifically, at pages 2-3, the Action states the following:

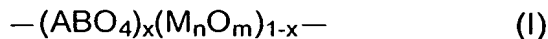
Moon illustrates in figures 2-5E, particularly figure 2, (entire document) a non-crystalline oxide represented by the formula (I):



O is oxygen; M is an element selected from either Group IIIB or Group IVB of the periodic table (CAS version); n ranges from about 0.5 to about 2.5, m ranges from about 1.5 to about 3.5; and x is 0.

Applicants have amended Claim 1 to recite as follows:

1. (Amended) A non-crystalline oxide represented by the formula (I):



wherein:

A is an element selected from Group IIIA of the periodic table;

B is an element selected from Group VB of the periodic table;

O is oxygen;

M is an element selected from either Group IIIB or Group IVB of the periodic table; and

n ranges from about 0.5 to about 2.5, m ranges from about 1.5 to about 3.5, and $0 < x < 1$. (emphasis added).

Claim 11 has also been amended to include the recitation " $0 < x < 1$."

Thus, Applicants submit that each and every recitation of the claims as presented in the present application is not found in Moon as required to establish anticipation under 35 U.S.C. § 102. See *W. L. Gore & Associates Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

Accordingly, Applicants respectfully request that the rejection of Claims 1, 3, 11, 15-17, 19 and 22 under 35 U.S.C. § 102(b) be withdrawn.

III. Rejection Under 35 U.S.C. § 102(e)

Claims 1, 2, 11, 14, 16-18 and 23 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,407,435 to Ma et al. (Ma et al.). Claims 24 and 34 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Aguilar et al. ("Aguilar") from Journal of the European Ceramic Society vol. 20.

More specifically, at page 4, the Action states the following:

Ma illustrates in figures 1-8, particularly figure 2, (entire document) a non-crystalline oxide represented by the formula (I):



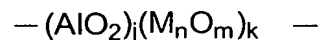
O is oxygen; M is an element selected from either Group IIIB or Group IVB of the periodic table; n ranges from about 0.5 to about 2.5, m ranges from about 1.5 to about 3.5; and x is 0.

As stated above in section II, Applicants have amended Claims 1 and 11 to include the recitation " $0 < x < 1$." Therefore, Applicants submit that each and every recitation of the claims as presented in the present application is not found in Ma et al. as required to establish anticipation under 35 U.S.C. § 102. *See W. L. Gore & Associates Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

Accordingly, Applicants respectfully request that the rejection of Claims 1, 2, 11, 14, 16-18 and 23 under 35 U.S.C. § 102(e) be withdrawn.

At page 5, the Action further states the following:

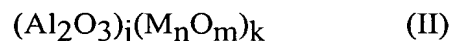
Aguilar illustrates in figures 1-8, particularly figure 2, (entire document) a non-crystalline oxide represented by the formula (I):



wherein Al is aluminum, O is oxygen, M is the element Y; and j ranges from about 2, k is equal to about 1; n is about 2.0, and m is about 2.0 or the formula is $(\text{AlO}_2)_2(\text{Y}_2\text{O}_2)_1$ or $\text{Y}_2\text{O}_3\text{-Al}_2\text{O}_3$.

Applicants have amended Claim 24 to recite as follows:

24. (Amended) A non-crystalline oxide represented by the formula (II):



wherein:

Al is aluminum;

O is oxygen;

M is an element selected from either Group IIIB or Group IVB of the periodic table; and

j ranges from about 0.5 to about 4.5; k is equal to about 1; n ranges from about 0.5 to about 2.5, and m ranges from about 1.5 to about 3.5.

Applicants have also amended Claim 34 to include the formula $(\text{Al}_2\text{O}_3)_j(\text{M}_n\text{O}_m)_k$.

Thus, Applicants submit that each and every recitation of the claims as presented in the present application is not found in Aguilar et al. as required to establish anticipation under 35 U.S.C. § 102. *See W. L. Gore & Associates Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

Accordingly, Applicants respectfully request that the rejection of Claims 24 and 34 under 35 U.S.C. § 102(e) be withdrawn.

IV. Rejection Under 35 U.S.C. § 103

Claims 12 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moon, and further in view of U.S. Patent No. 5,654,566 to Johnson (Johnson). More specifically, the Action states the following at page 6:

Moon is discussed above, it does not show the substrate comprises a material selected from the group consisting of a Group III-V binary alloy, a Group III-V quaternary alloy, a Group III-nitride alloy, and combinations thereof. Johnson illustrates in figure 2 a the substrate comprises InGaAs. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have InGaAs for a magnetic spin injected-FET.

Applicants respectfully traverse this rejection.

Applicants submit that in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103, cited references, when combined, must teach or suggest *all* the recitations of the claims, and there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. M.P.E.P. §2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. M.P.E.P. §2143.01, citing *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). To support combining references, evidence of a suggestion, teaching, or motivation to combine must be **clear and particular**, and this requirement for clear and particular evidence is not met by broad and conclusory statements about the teachings of references. *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). The Court of Appeals for the Federal Circuit has further stated that, to support combining or modifying references, there must be **particular** evidence from the prior art as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed. *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000).

In the present case, Applicants respectfully submit that the cited references, alone or when combined, do not teach or suggest *all* the recitations of the claims, and there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. More specifically, Claim 12 relates to a field effect transistor (FET) wherein the

substrate comprises a material selected from the group consisting of a Group III-V binary alloy, a Group III-V quaternary alloy, a Group III-nitride alloy, and combinations thereof. In contrast, as the Action notes, Moon fails to show a substrate that comprises a material selected from the group consisting of a Group III-V binary alloy, a Group III-V quaternary alloy, a Group III-nitride alloy, and combinations thereof. Instead, Moon proposes a metal-ferroelectric insulator semiconductor field effect transistor (MFOS FET) ferroelectric memory device comprising a p-type silicon substrate. *See* Col. 4, lines 43-48. Moreover, as noted above in section II discussing the rejection of the claims under 35 U.S.C. § 102(b) over Moon, Moon fails to teach the non-crystalline oxide represented by the formula of the claims of the present invention.

Turning to Johnson, in figure 2, this reference merely proposes a FET current modulator using ferromagnetic films wherein the substrate comprises InGaAs. Thus, Johnson does not supply the missing recitations enabling one of ordinary skill in the art to arrive at the present invention related to a FET as recited in Claims 12 and 13. Therefore, even if combined, Moon and Johnson do not provide all the recitations of Claims 12 and 13. As such, the combination of Moon and Johnson also fails to provide a reasonable expectation of success of arriving at the present invention -- another established criterion of obviousness under 35 U.S.C. § 103. Consequently, it is only in view of the present invention that one is able to arrive at a FET as disclosed in Claims 12 and 13 of the present invention.

Accordingly, Applicants respectfully submit that Claims 12 and 13 are not unpatentable under 35 U.S.C. § 103(a) in view of Moon alone, or in combination with Johnson, and request that this rejection be withdrawn.

IV. Allowable Subject Matter

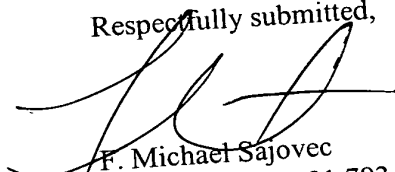
Applicants appreciate the indication that Claims 20, 21, 25, 26 and 35-46 contain allowable subject matter. Applicants have amended the rejected base claims, both Claim 17 and 34, as stated above. Applicants believe these amendments render the base claims patentable, as well as Claims 20, 21, 25, 26 and 35-46 which are dependent therefrom.

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V. Conclusion

In view of the foregoing remarks, Applicants respectfully request that all outstanding rejections to the claims be withdrawn and that a Notice of Allowance be issued in due course. Any questions that the Examiner may have should be directed to the undersigned, who may be reached at (919) 854-1400.

Respectfully submitted,

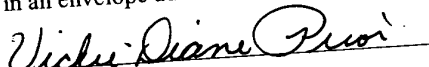

F. Michael Sajovec
Registration No. 31,793



20792
PATENT TRADEMARK OFFICE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231, on December 3, 2002.


Vickie Diane Prior
Date of Signature: December 3, 2002

Version With Markings To Show Changes Made

In the Specification:

Please amend the paragraph starting on page 1, line 3-6 as follows:

-- Cross-Reference to Related Applications

The present application claims priority to U.S. Provisional Application No. 60/214,285 filed June 26, 2000 [2001], the disclosure of which is incorporated herein by reference in its entirety.--

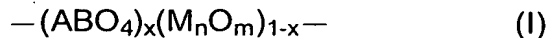
Please amend the paragraph starting on page 2, line 4-14 as follows:

-- Recently, aluminum oxide has been the focus of several studies. Klein *et al. Appl. Phys. Lett.* **75**, 4001 (1999) propose the deposition of aluminum oxide with a CVD growth method. This reference proposes a silicate layer being present at the interface on aluminum oxide and silicon, as measured by nuclear resonance profiling (NRP) and X-ray photoelectron spectroscopy (XPS). Gusev *et al. Appl. Phys. Lett.* **76**, 176 (2000) propose atomic layer CVD (ALCVD) where they investigated both the physical and electrical properties of an aluminum oxide layer. Gusev [Gusey] *et al.* propose that it is possible to deposit aluminum oxide on hydrogen-terminated [hydrogen-terminate] silicon without forming an interfacial layer using NRP, medium energy ion scattering (MEIS), and high-resolution transmission electron microscopy (TEM).--

In the Claims:

Please amend Claim 1 as follows:

1. (Amended) A non-crystalline oxide represented by the formula (I):



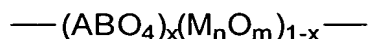
wherein:

A is an element selected from Group IIIA of the periodic table;
B is an element selected from Group VB of the periodic table;
O is oxygen;
M is an element selected from either Group IIIB or Group IVB of the periodic table; and
n ranges from about 0.5 to about 2.5, m ranges from about 1.5 to about 3.5, and

$0 < x < 1$ [x is a fraction ranging from 0 to 1].

Please amend Claim 4 as follows:

4. (Amended) A method of forming a non-crystalline oxide represented by the formula (I):

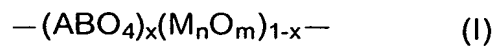


wherein A is an element selected from Group IIIA of the periodic table, B is an element selected from Group VB of the periodic table, O is oxygen, M is an element selected from either Group IIIB or Group IVB of the periodic table, n ranges from about 0.5 to about 2.5, m ranges from about 1.5 to about 3.5, and $0 < x < 1$ [x is a fraction ranging from 0 to 1], said method comprising:

delivering a gaseous source comprising element A, a gaseous source comprising element B, a gaseous source comprising element M, and a gaseous source comprising oxygen on a substrate such that the gaseous source comprising element A, the gaseous source comprising element B, the gaseous source comprising element M, and the gaseous source comprising oxygen react to form the non-crystalline oxide.

Please amend Claim 11 as follows:

11. (Amended) A field effect transistor comprising:
an integrated circuit substrate having a first surface;
source and drain regions in said substrate at said first surface in a spaced apart relationship; and
a gate insulating layer on said substrate at said first surface between said spaced apart source and drain regions, said gate insulating layer comprising a non-crystalline oxide represented by the formula (I):

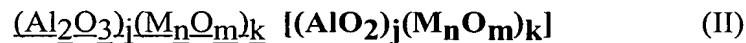


wherein:

A is an element selected from Group IIIA of the periodic table;
B is an element selected from Group VB of the periodic table;
O is oxygen;
M is an element selected from either Group IIIB or Group IVB of the periodic table;
n ranges from about 0.5 to about 2.5;
m ranges from about 1.5 to about 3.5; and
 $0 < x < 1$ [x is a fraction ranging from 0 to 1].

Please amend Claim 24 as follows:

24. (Amended) A non-crystalline oxide represented by the formula (II):



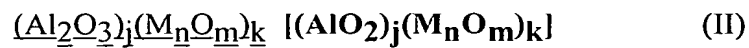
wherein:

Al is aluminum;
O is oxygen;
M is an element selected from either Group IIIB or Group IVB of the periodic table; and
j ranges from about 0.5 to about 4.5; k is equal to about 1; n ranges from about 0.5 to about 2.5, and m ranges from about 1.5 to about 3.5.

Please amend Claim 34 as follows:

34. (Amended) A field effect transistor comprising:
an integrated circuit substrate having a first surface;
source and drain regions in said substrate at said first surface in a spaced apart relationship; and
a gate insulating layer on said substrate at said first surface between said spaced apart source and drain regions, said gate insulating layer comprising a non-crystalline oxide represented by the formula (II):

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wherein:

Al is aluminum, O is oxygen, M is an element selected from either Group IIIB or Group IVB of the periodic table, j ranges from about 0.5 to about 4.5, k is equal to about 1, n ranges from about 0.5 to about 2.5, and m ranges from about 1.5 to about 3.5.
